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of the coals and their relatively high percentage of ash is probably a result from this mode of origin as is also the absence of fire clays beneath them. The available reserves of the field are estimated at three and one-half billion tons.

E. S. BASTIN

Summary Report, Canadian Geological Survey. Ottawa, 1919.
Part C. Alberta-Saskatchewan Region. Pp. 52.

1. "Cretaceous, Lower Smoky River, Alberta." By F. H. McLEARN.
2. "Geology of the Swan Hills in Lesser Slave Lake District, Alberta." By JOHN A. ALLEN.
3. "Northern Part of Crowsnest Coal Field, Alberta." By BRUCE ROSE.
4. "Gasoline in Natural Gas. Experiments on Alberta Gas." By D. B. DOWLING.
5. "Surface Deposits of Southeastern Saskatchewan." By J. STANSFIELD.

The annual *Summary Report of the Canadian Geological Survey* for 1917 and since is issued in parts and each part is designated by a letter of the alphabet. Before 1917 the whole annual *Summary* was bound in one large volume.

1. The Cretaceous begins with the Lower Cretaceous and extends into the Montana group of the Upper. Marine and non-marine formations alternate and the total thickness represented is about 4,470 ft. The Dakota sandstone cannot be recognized in its normal subaerial development. The beds dip to the south from 12 to 60 ft. per mile and represent the north limb of a very broad, shallow syncline. The structure is not favorable for oil.

2. The Swan Hills lie south of Lesser Slave Lake, have a maximum elevation of 4,320 ft. above sea-level, and represent remnants of a once more extensive, maturely dissected upland. The Cretaceous is represented by the Montana group. The basal member is marine, and the upper two members, the Sawbridge and Edmonton, are of fresh-water origin. The early Tertiary is represented by the Paskapoo formation but there is no marked unconformity between the Upper Cretaceous and the Tertiary.

3. Formations ranging from Devono-Carboniferous to Upper Cretaceous, probably Tertiary, in age, are described. Coal seams of

economic importance are found only in the Kootenay, and a large reserve of bituminous coal occurs within the Rocky Mountains.

4. This is a description of the apparatus and the results of a number of experiments carried on at various gas wells. At the pressures under which the tests were made the amount of gasoline in the Alberta gases per 1,000 cu. ft. varied from 0.1 pints to 3.7 pints.

5. This area is covered with glacial drift, averaging from 40 to 70 ft. in thickness. Two main terminal moraines cross the area but ground moraine covers most of the area. The residual alkali material formed in the dried-up sloughs contains only a very small per cent of potash, and is of no economic importance. The waters from the drift are hard and contain calcium and magnesium carbonates and sulphates while the waters from wells reaching the Tertiary strata are soft and contain considerable sodium chloride.

Part D. Manitoba Region. Pp. 19.

1. "Athapapuskow Lake District, Manitoba." By E. L. BRUCE.
2. "The District Lying between Reed Lake and Elbow Lake, Manitoba." By E. L. BRUCE.
3. "Reed-File Lakes Area, Manitoba." By F. J. Alcock.
4. "Wekusko Lake Area, Manitoba." By F. J. Alcock.
5. "Superficial Deposits and Soils of Winnipegosis Area, Manitoba." By W. A. JOHNSTON.
6. "Gold-Quartz Veins and Scheelite Deposits of South-eastern Manitoba." By E. L. BRUCE.

1. Chalcopyrite was discovered along joint or fracture zones in fine-grained, massive greenstone. Some distance from these occurrences the greenstone is intruded by granite and these deposits are directly related to these intrusions. With the present conditions of transportation mining conditions are not favorable for this area.

2. The geology of this area is much simpler than that of other nearby areas in northern Manitoba as the pre-Cambrian is represented by the Amisk series of greenstones and derived schists, and intrusive granites. The younger pre-Cambrian formations are absent, and since the crest of a large anticline crosses this area these younger formations have probably been removed by erosion from the crest of this anticline. Ordovician dolomites and Glacial and Recent deposits are noted. No

economic deposits have yet been discovered and on the whole conditions for the formation of ore deposits have not been as favorable as in nearby areas.

3. The pre-Cambrian rocks of this area are divided into an igneous complex consisting of altered volcanic and intrusive rocks, a sedimentary complex of granite-gneiss and staurolite-schist, and batholithic intrusives. Ordovician dolomites occur and Pleistocene and Recent deposits are abundant.

4. The geology of this area is very similar to that of the Reed-File lakes area. A number of productive gold-bearing quartz veins occur near the borders of the granite masses.

5. Because of the practical exhaustion of homestead prairie land in easily accessible areas, a map of an area of about 1,500 sq. mi. around Lake Winnipegosis was prepared. This map will show the character of the soil and forests and will also indicate the land that can be readily cleared.

6. The gold-quartz veins in the pre-Cambrian rocks of southeastern Manitoba were sampled and assayed for both gold and platinum. Most of the assays showed a very small amount of gold present but in no case was platinum detected. In a fine-grained, massive, roughly sheeted, hornblende rock scheelite occurs in small vuggy lenses not in all cases parallel to the sheeting. The returns from a shipment of the ore to the Ore Dressing Laboratory, Ottawa, were not encouraging.

Part F. Maritime Province Region. Pp. 36, figs. 3.

1. "Investigations in Western Nova Scotia." By E. R. FARIBAULT.

2. "Investigations in Western Nova Scotia and New Brunswick." By ALBERT O. HAYES.

3. "Peat Investigations." By A. ANREP.

1. A description of a number of small manganese deposits in Nova Scotia and notes on the occurrence of platinum in the scheelite and gold veins of the gold-bearing series.

2. The drift over the Carboniferous rocks of the Sydney coal basin contains boulders of rocks which outcrop to the south of the basin and this with the general direction of glacial striae proves that the direction of ice movement in this part of Cape Breton Island was northward. This report is almost entirely economic and gives many details concerning the structure and extent of a number of coal horizons. The New

Ross, Lunenburg County, manganese deposits are described as occurring along a fissure in granite. Calcite and manganese oxide was deposited in this fissure and later movements broke up this vein and formed a fault breccia. Secondary enrichment from surface waters has concentrated the manganese oxide into bodies of workable size and high-grade ore.

3. A few preliminary results are given of investigations of peat bogs near St. John and Moncton, New Brunswick.

Part G. The Platinum Situation in Canada, 1918. By J. J. O'NEILL. Pp. 19, map.

The chief platinum-producing areas in Canada are in Ontario, British Columbia, and Yukon. In the nickel-copper ores of Sudbury, Ontario, platinum occurs as sperrylite, the platinum arsenide. In British Columbia platinum is found both in the solid rocks and the gravels. In the solid rocks three distinct types of deposits are recognized—first, in association with chromite in peridotite-pyroxenite rocks; second, in association with chalcopyrite deposits; third, in shear zones in typical granite. In the gravels of Yukon platinum is widely distributed but not in large enough quantities to be profitably exploited for this metal alone.

Canada appears to have possibilities of becoming one of the great producers of platinum. In 1918 only one hundred ounces of platinum were recovered, but probably more than 50,000 ounces of the platinum metals were contained in ores mined in Canada, but not recovered.

J. F. W.

The Silurian Geology and Faunas of Ontario Peninsula, and Manitoulin and Adjacent Islands. By M. Y. WILLIAMS. Canadian Geological Survey, Ottawa, Memoir 111, 1919. Pp. 195, appendices III, pls. XXXIV, figs. 6, maps 2.

In this memoir the author gives his conclusions, based on five seasons of detailed field work, on the general Silurian problems of southwestern Ontario. Detailed sections, descriptions, notes on origin and correlation, and complete fossil lists for the various members of the Silurian system are given. Nine diagrams are given to illustrate the conditions of sedimentation during various stages of the Silurian period. Nine new species of brachiopods and one new variety are described. The three appendices contain descriptions of a new species of brachiopod